

CLAIMS

[0282]

1. A material comprising a thermoplastic polyimide resin surface-treated to exhibit an adhesive strength of 5 N/cm or more when an electroless-plated film is formed on a surface thereof.

[0283]

2. The material according to claim 1, wherein the surface treatment is surface treatment for forming roughness on a surface of a thermoplastic polyimide resin film.

[0284]

3. The material according to claim 1, wherein the surface treatment is surface treatment for partially removing a surface layer of a thermoplastic polyimide resin film.

[0285]

4. The material according to claim 1, wherein the surface treatment comprises a combination of surface treatment for forming roughness on a surface of a thermoplastic polyimide resin film and surface treatment for partially removing a surface layer of a thermoplastic polyimide resin film.

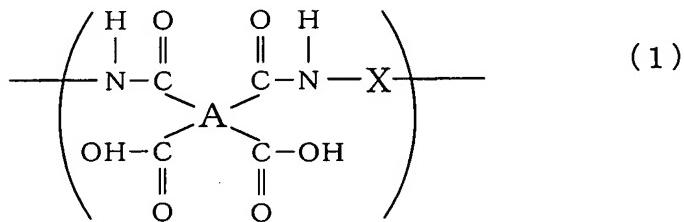
[0286]

5. The material according to claim 1, wherein the

surface-treated thermoplastic polyimide resin has a surface with a ten-point medium height Rz of 3  $\mu\text{m}$  or less.

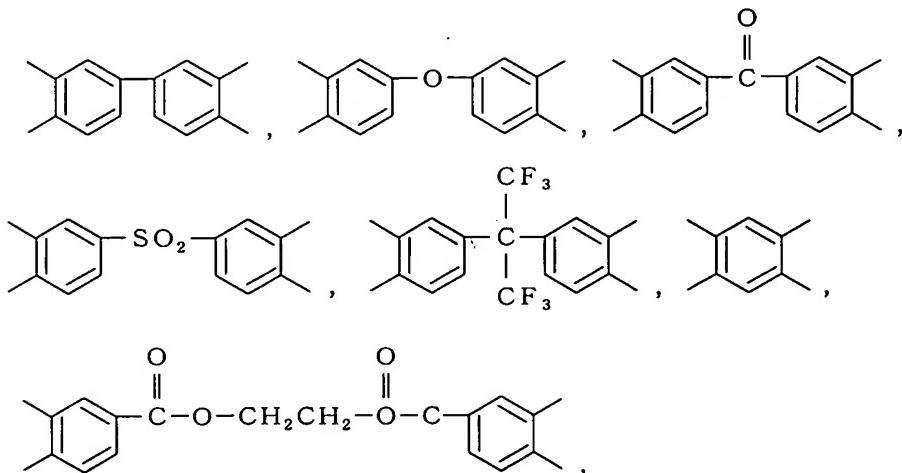
[0287]

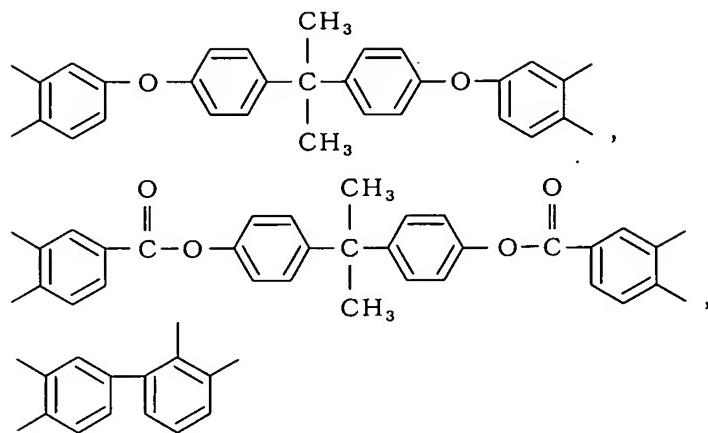
6. The material according to claim 1, wherein the thermoplastic polyimide resin is produced by dehydration and ring closure of a polyamic acid represented by formula (1) :



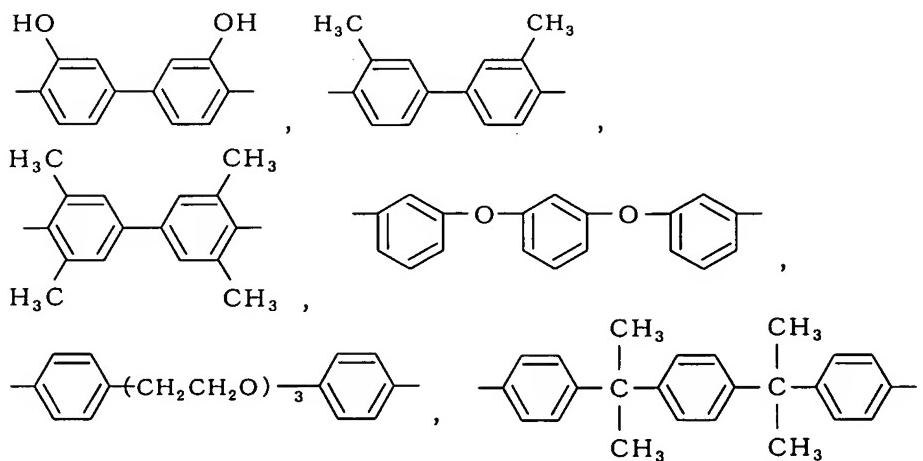
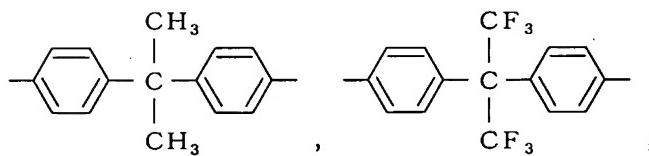
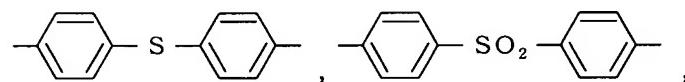
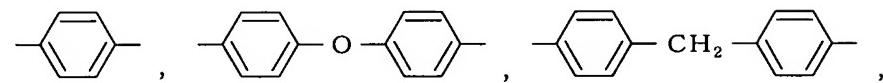
(wherein A represents at least one tetravalent organic group selected from the following group (2), and X represents a divalent organic group selected from the following group (3)):

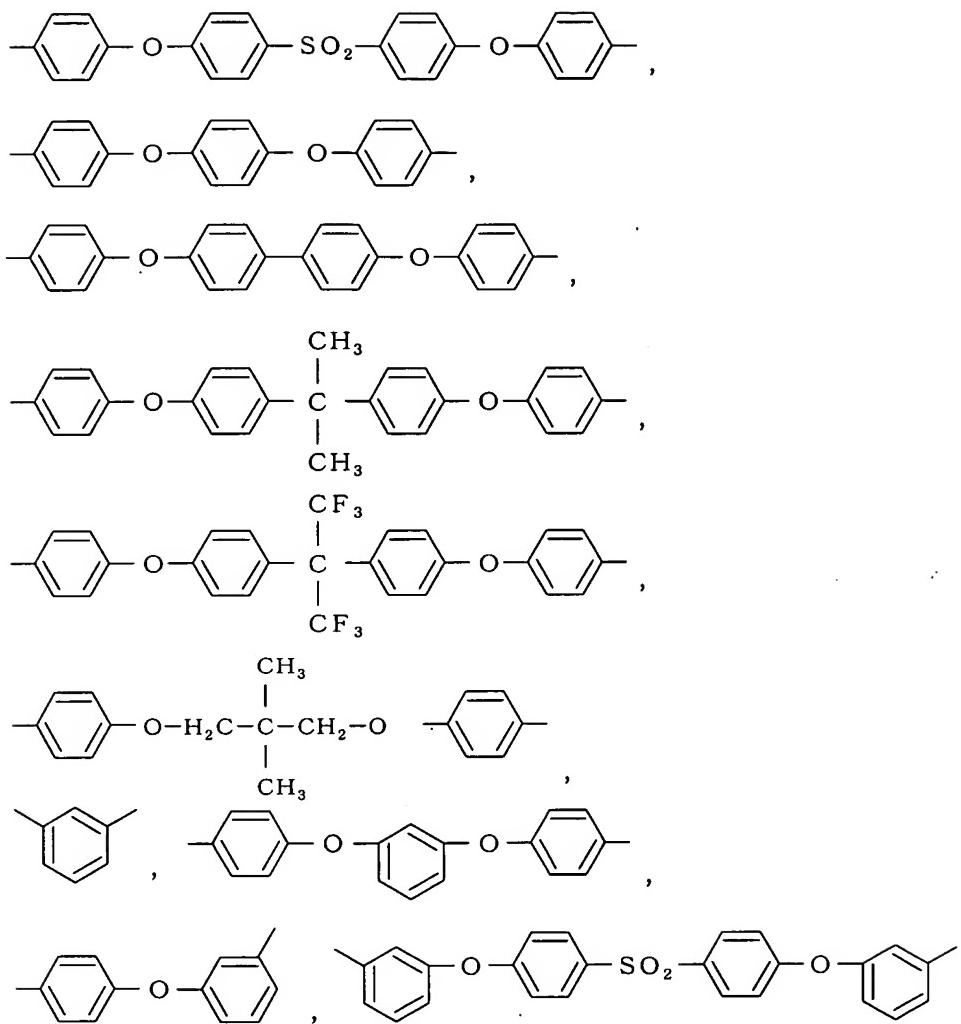
Group (2)





Group (3)





[0288]

7. A laminate comprising a layer provided on one of the surfaces of a non-thermoplastic polyimide film, the layer comprising the material including the thermoplastic polyimide resin according to claim 1.

[0289]

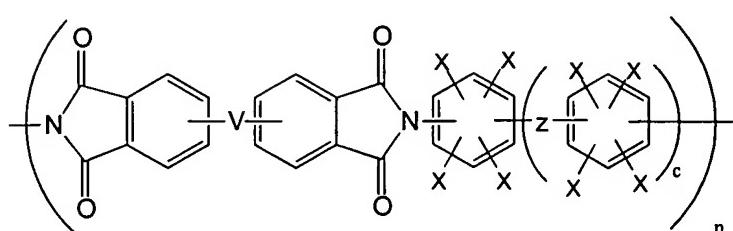
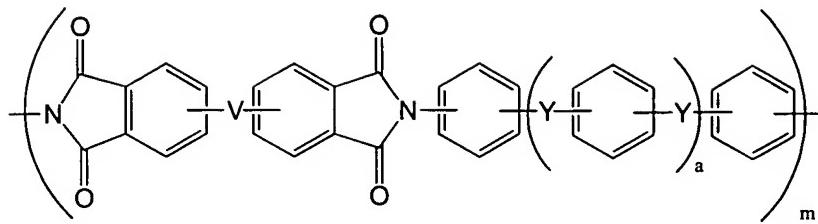
8. A laminate comprising a layer provided on one of the surfaces of a non-thermoplastic polyimide film and comprising the material including the thermoplastic polyimide resin according to claim 1, and a layer comprising the material including the thermoplastic polyimide resin, a copper foil, or an adhesive layer provided on the other surface.

[0290]

9. The laminate according to claim 7 or 8, wherein the thickness of the layer comprising the material including the thermoplastic polyimide resin and formed on the non-thermoplastic polyimide, is 10  $\mu\text{m}$  or less and smaller than that of the non-thermoplastic polyimide film.

[0291]

10. A laminate comprising a polymer film and a layer provided on at least one of the surfaces thereof, the layer comprising a polyimide resin composition containing a thermoplastic polyimide resin and a thermosetting component, and the thermoplastic polyimide resin having a structure represented by formula (2):



(2)

(wherein m is an integer of 1 or more; n is an integer of 0 or more; V represents -O-, -O-T-O-, or -C(=O)-O-T-O(C=O)-; T represents a divalent organic group; Y's may be the same or different and each represent -C(=O)-, -SO<sub>2</sub>-, -O-, -S-, -(CH<sub>2</sub>)<sub>b</sub>-, -NHCO-, -C(CH<sub>3</sub>)<sub>2</sub>-, -C(CF<sub>3</sub>)<sub>2</sub>-, -C(=O)O-, or a single bond; a and b independently represent an integer of 0 to 5; Z represents -C(=O)-, -SO<sub>2</sub>-, -O-, -S-, -(CH<sub>2</sub>)<sub>d</sub>-, -NHCO-, -C(CH<sub>3</sub>)<sub>2</sub>-, -C(CF<sub>3</sub>)<sub>2</sub>-, -C(=O)O-, or a single bond; c and d independently represent an integer of 0 to 5, and X's may be the same or different and each represent an independent functional group containing at least one functional group selected from -OH, -COOH, -OCN, and -CN).

[0292]

11. The laminate according to claim 10, wherein a film or adhesive layer comprising the polyimide resin

composition including the thermoplastic polyimide resin and the thermosetting component is provided on the surface of the polymer film opposite to the surface on which the layer comprising the composition containing the thermoplastic polyimide resin and the thermosetting component is provided.

[0293]

12. A resin film having a surface shape formed on at least one of the surfaces thereof, the surface shape having a Ra1 value of arithmetic mean roughness of 0.05  $\mu\text{m}$  to 1  $\mu\text{m}$  measured with a cutoff value of 0.002 mm, and a Ra1/Ra2 ratio of 0.4 to 1, Ra2 being a value measured with a cutoff value of 0.1 mm.

[0294]

13. The resin film according to claim 12, comprising a polyimide resin.

[0295]

14. A laminate comprising at least one layer of the resin film according to claim 12.

[0296]

15. The laminate according to claim 12 further comprising a metal layer provided on the surface having the surface shape.

[0297]

16. A method for manufacturing a printed wiring board

using the laminate or the resin film according to claims 1, 7, 8, 10, or 12.

[0298]

17. The method according to claim 16 comprising at least a step of electroless copper plating.

[0299]

18. The method according to claim 16 comprising:

a step of opposing a metal foil to a surface of a laminate on which a layer comprising a polyimide resin composition containing a thermoplastic polyimide resin and/or a thermosetting component is formed, opposing a circuit plane of an inner wiring board to the other surface with an adhesive provided therebetween, and laminating the metal foil, the laminate, and the inner wiring board by a method under heating and/or pressure to form a laminate; and

a step of removing the metal foil from the surface of the laminate.

[0300]

19. The method according to claim 16 comprising at least a step of forming a metal layer by sputtering.

[0301]

20. The method according to claim 16, wherein a circuit is formed by a subtractive method.

[0302]

21. The method according to claim 16, wherein a circuit  
is formed by an semi-additive process.